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# TRANSMITTAL FORM

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| Total Number of Pages in This Submission | 32 |

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| Application Number | 10/726,357 |
| Filing Date | December 3, 2003 |
| First Named Inventor | SKOOG et al. |
| Art Unit | 1762 |
| Examiner Name | David P. TUROCY |
| Attorney Docket Number | 13DV-13672 (07783-0086-CIP1) |

**ENCLOSURES** ***(check all that apply)***

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment / Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
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- ☐ After Allowance Communication to TC
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- ☒ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) *(please identify below)*:

**Revised Appeal Brief (30 pages): Return Receipt Postcard; Certificate of Mailing**

**Remarks**

**SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT**

| | | | |
|---|---|---|---|
| Firm | McNees Wallace & Nurick LLC | | |
| Signature | K. Scott O'Brian | | |
| Printed Name | K. Scott O'Brian | | |
| Date | October 21, 2005 | Reg. No. | 42,946 |

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Revised Appeal Brief (30 pages)

Attorney Docket No.: 13DV-13672 (07783-0086-CIP1)
Application No.: 10/726,357
Filed: December 3, 2003

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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|---|---|---|---|
| In re Application of: | SKOOG et al. | | |
| Application No.: | 10/726,357 | Group Art Unit: | 1762 |
| Filed: | December 3, 2003 | Examiner: | David P. TUROCY |

For: SPRAYABLE NOBLE METAL COATING FOR HIGH TEMPERATURE USE ON CERAMIC AND SMOOTHCOAT COATED AIRCRAFT ENGINE PARTS

## REVISED APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Revised Appeal Brief is being filed within one month from a Notification of Non-Compliant Appeal Brief. The original Appeal Brief was filed on August 5, 2005, which was within two months from the Notice of Appeal submitted June 6, 2005 pursuant to 37 C.F.R. §41.37(a). This Revised Appeal Brief is being submitted in response to a Notification of Non-Compliant Appeal Brief dated October 11, 2005, an Advisory Action dated June 21, 2005, a Final Office Action dated March 30, 2005 and a first Office Action dated January 4, 2005.

Appellant has previously authorized the Fee for Filing a Brief in Support of an Appeal of $500.00 and any other charges necessary for consideration of this appeal to be charged to Deposit Account No. 50-1059 with the submittal of the Appeal Brief on August 5, 2005.

## 1. *REAL PARTY IN INTEREST*

The real party of interest in this pending application is General Electric Company, One River Road, Schenectady, New York, 12345, Assignee of inventors' interest, which assignment has been duly recorded in the United States Patent and Trademark Office.

## 2. *RELATED APPEALS AND INTERFERENCES*

Application 10/726,361 is co-pending with the present application. It is unknown whether the pending appeal in the current application may directly affect or be directly affected by or have a bearing on prosecution of the co-pending application.

## 3. *STATUS OF CLAIMS*

Claims 1-22 are under final rejection and are appealed. An unmarked copy of the appealed claims in response to the First Office Action dated January 4, 2005, which is the last form acted on the Examiner, is attached hereto in Appendix I.

## 4. *STATUS OF AMENDMENTS*

Appellants' Second Response under 37 CFR §1.116 dated June 6, 2005 in response to a Final Office Action dated March 30, 2005 has not been acted upon by the Examiner. The Examiner refused entry of amendments to independent claims 1 and 16 submitted by Appellants in a Response under 37 C.F.R. §1.116 dated June 6, 2005, stating in an Advisory Action dated June 21, 2005 that the proposed amendments raised new issues that would require further consideration and/or search. However, the Examiner provided no further explanation as to why the amendments would require further consideration and/or search. The Examiner alleged to have performed a cursory search for support of the added limitations in the present application without success. Appellants would have been pleased to direct the Examiner to paragraph 14 of the present application. Further, Appellants assert that the amended claims place the claims in better condition for allowance.

## 5. *SUMMARY OF CLAIMED SUBJECT MATTER*

Independent claim 1 recites a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine having an outer ceramic surface, step 40 (*see e.g.,* Specification at page 7, line 20 to page 8 line 4 and Fig. 3); providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment and an evaporable carrier, step 54 (*see e.g.,* Specification at page 8, lines 5-27 and Fig. 3); applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer, step 54 (*see e.g.,* Specification at page 8, line 5 to page 9, line 19 and Fig. 3); and firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component, step 56 (*see e.g.,* Specification at page 9, lines 20-25 and Fig. 3).

Independent claim 16 recites a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine, the component having a ceramic surface, step 40 (*see e.g.,* Specification at page 10, lines 7-12 and Fig. 6); pre-treating the component surface to form a pre-treated component surface, step 42 (*see e.g.,* Specification at page 10, line 12 to page 11, line 5 and Fig. 6); thereafter air-assisted spraying a reflective-coating mixture onto the pre-treated component surface, step 54 (*see e.g.,* Specification at page 11, lines 6-7, Fig. 6, and page 9, lines 1-18 and Fig. 5); the reflective-coating mixture comprising a metallic pigment and a reflective-coating-mixture carrier (*see e.g.,* Specification at page 11, line 21 to page 12, line 4); and firing the component having the coating mixture thereon, step 56 (*see e.g.,* Specification at page 12, lines 10-15 and Fig. 6).

Dependent claim 2 recites the method of claim 1, wherein the step of applying the reflective-coating mixture includes applying the reflective-coating mixture by air-assisted spraying, step 54 (*see e.g.,* Specification at page 8, line 5 to page 9, line 19).

Dependent claim 9 recites the method of claim 6, wherein the step of applying the ceramic barrier coating further includes the step of air-assisted spraying the ceramic-barrier-

coating mixture onto the component, and drying the ceramic-barrier-coating mixture (*see e.g.,* Specification at page 9, lines 18-19).

Dependent claim 10 recites the method of claim 1 wherein the provided reflective-coating mixture further comprises a noble metal encapsulator (*see e.g.,* Specification at page 8, lines 22-27).

Dependent claim 11 recites the method of claim 1 wherein the provided reflective coating mixture contains a predetermined amount of filler (*see e.g.,* Specification at page 12, lines 5-9).

Dependent claim 12 recites the method of claim 11 wherein the filler material is glass or ceramic materials (*see e.g.,* Specification at page 12, lines 5-9).

Dependent claim 13 recites the method of claim 12 wherein the filler comprises up to about 25 percent of the reflective mixture by weight (*see e.g.,* Specification at page 12, lines 5-9).

Dependent claim 18 recites the method of claim 17, wherein the step of applying the ceramic coating further includes the steps of air-assisted spraying a ceramic-barrier-coating mixture onto the component, and drying the ceramic-barrier-coating mixture (*see e.g.,* Specification at page 10, line 20 to page 11, line 11).

Dependent claim 19 recites the method of claim 16 wherein the step of spraying reflective-coating mixture further includes spraying a mixture comprising a noble metal encapsulator (*see e.g.,* Specification at page 8, lines 22-27).

Dependent claim 20 recites the method of claim 16 wherein the step of spraying the reflective coating mixture includes spraying a mixture that includes a predetermined amount of filler (*see e.g.,* Specification at page 12, lines 5-9).

Dependent claim 21 recites the method of claim 20 wherein the filler material is selected from the group consisting of glass and ceramic materials (*see e.g.,* Specification at page 12, lines 5-9).

Dependent claim 22 recites the method of claim 21 wherein the filler comprises up to about 25 percent of the reflective mixture by weight (*see e.g.*, Specification at page 12, lines 5-9).

## 6. *GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL*

1.) Whether claims 1-5 are unpatentable under the judicially created doctrine of obviousness-type double patenting over Skoog et al. (U.S. Patent No. 6,720,034), hereinafter "Skoog."

2.) Whether claims 1-9 and 16-18 are unpatentable under the judicially created doctrine of obviousness-type double patenting over Skoog, in view of Rigney et al. (U.S. Patent No. 6,455,167), hereinafter "Rigney."

3.) Whether claims 1-6 and 8 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj et al. (U.S. Patent No. 5,545,437), hereinafter "Nagaraj", in view of Klabunde (U.S. Patent No. 4,877,647) hereinafter "Klabunde," and further in view of Kirk-Othmer and Rigney.

4.) Whether claim 7 is unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 6, and further in view of Vakil (U.S. Patent No. 5,407,705) hereinafter "Vakil."

5.) Whether claim 9 is unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 6, and further in view of Eppler.

6.) Whether claim 10 is unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 1, and further in view of Tecle (U.S. Patent No. 5,922,403) hereinafter "Tecle."

7.) Whether claims 11-13 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 1, and further in view of Akechi (Japanese Publication No. JP 60081892A) hereinafter "Akechi."

8.) Whether claims 11-13 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 1, and further in view of Skoog.

9.) Whether claims 16-22 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney, Eppler, Tecle, Akechi and further in view of Demaray (U.S. Patent No. 4,676,994) hereinafter "Demaray."

## 7. *ARGUMENT*

### A. Discussion of Ground 1.

Ground 1 - Whether claims 1-5 are unpatentable under the judicially created doctrine of obviousness-type double patenting over Skoog et al. (U.S. Patent No. 6,720,034), hereinafter "Skoog."

The Examiner states in the Final Office Action

> Claims 1-5 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 2,4-6 and 7 of U.S. Patent No. 6720034. Although the conflicting claims are not identical, they are not patentably distinct from each other because after the application of a ceramic barrier coating in claim 7 of the existing patent the component of the gas turbine engine inherently has an outer ceramic surface.

Appellants respectfully traverse the obviousness-type double patenting rejection.

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974).

All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

Skoog, as understood, from which the present invention is a continuation in part, is directed to a method of applying a heat rejection coating to a metallic component of a gas turbine engine. In contrast, the present invention is directed to applying a heat rejection coating to a ceramic component, as conceded by the Examiner.

In contrast, Claim 1 is directed to a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine having an outer ceramic surface; providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment and an evaporable carrier; applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer; and firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component. (emphasis added).

As to the Examiner's position that claim 7 of Skoog is not patentably distinct from the present invention, Appellants would like to point out that claim 7 of Skoog depends on claim 1, in which the first step recites supplying a metallic component of a gas turbine engine, before applying a reflective coating in the next step of claim 1. Claim 7 recites

> The method of claim 1, further including an additional step, after the step of supplying and before the step of applying the reflective-coating mixture, of applying a ceramic barrier coating onto the component, and wherein the step of applying the reflective-coating mixture includes the step of applying the reflective-coating mixture onto the ceramic barrier coating applied to the component.

(emphasis added) In other words, in claim 7, by virtue of the limitations of claim 1, also supplies a metallic component, wherein the ceramic barrier coat is then applied. The Examiner, is arguing that while the independent claim 1 is patentably distinct from the claims of the present invention, that a claim depending from claim 1 is not patentably distinct. Such reasoning is

contrary to patent law and is incorrect. Since claim 7 of Skoog recites supplying a metallic component before applying a ceramic coating to the component, it cannot be properly argued that the component has inherently has an outer ceramic surface, as it is only by partially practicing the method of Skoog (e.g., claim 7) that the ceramic coating is applied. To be patentably indistinct, a claim in Skoog must recite supplying a component of a gas turbine engine having an outer ceramic surface, which it does not.

Therefore, for the reasons given above, independent claim 1 is believed to be distinguishable from Skoog and therefore are neither anticipated nor rendered obvious by Skoog.

Dependent claims 2-5 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 2-5 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 1-5 are neither anticipated nor rendered obvious by Skoog and are therefore allowable.

B. Discussion of Ground 2.

Ground 2 - Whether claims 1-9 and 16-18 are unpatentable under the judicially created doctrine of obviousness-type double patenting over Skoog et al. (U.S. Patent No. 6,720,034), hereinafter "Skoog", in view of Rigney et al. (U.S. Patent No. 6,455,167), hereinafter "Rigney".

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974). All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

Claim 1 is directed to a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine having an outer ceramic surface; providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment

and an evaporable carrier; applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer; and firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component. (emphasis added).

Claim 2 is directed to the method of claim 1, wherein the step of applying the reflective-coating mixture includes applying the reflective-coating mixture by air-assisted spraying. (emphasis added).

Claim 9 is directed to the method of claim 6, wherein the step of applying the ceramic barrier coating further includes the step of air-assisted spraying the ceramic-barrier-coating mixture onto the component, and drying the ceramic-barrier-coating mixture. (emphasis added).

Claim 16 is directed to a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine, the component having a ceramic surface; pre-treating the component surface to form a pre-treated component surface; thereafter air-assisted spraying a reflective-coating mixture onto the pre-treated component surface, the reflective-coating mixture comprising a metallic pigment and a reflective-coating-mixture carrier; and firing the component having the coating mixture thereon. (emphasis added).

Claim 18 is directed to the method of claim 17, wherein the step of applying the ceramic coating further includes the steps of air-assisted spraying a ceramic-barrier-coating mixture onto the component, and drying the ceramic-barrier-coating mixture. (emphasis added).

Skoog, as understood, from which the present invention is a continuation in part, is directed to a method of applying a heat rejection coating to a metallic component of a gas turbine engine. In contrast, the present invention is directed to applying a heat rejection coating to a ceramic component, as conceded by the Examiner.

Rigney, as understood, is directed to coatings on superalloy substrates such as a diffusion layer applied to a substrate followed by subsequent alumina layer, followed by a ceramic topcoat. Although the ceramic topcoat may be classified as a thermal barrier coat to allow performance at higher temperatures (*see* col. 5, lines 21-23), a thermal barrier coat is not a reflective coat as specifically recited in the present invention. Therefore, Rigney cannot be

combined with other reference to teach providing a desired reflective-coating mixture to form a reflective coating on the ceramic component of the present invention. Furthermore, Rigney does not teach the application of coatings using any of the methods of the present invention, i.e., air-assisted spraying, airless spraying, brushing, and decal transfer, which are used to avoid the costly equipment and size limitations inherent in other methods. Therefore, the method in Rigney cannot render obvious the present invention, and in fact teaches away from the present invention.

Therefore, for the reasons given above, claims 1, 2, 9, 16 and 18 are believed to be distinguishable from Skoog in view of Rigney and therefore are not rendered obvious by the combination of Skoog and Rigney.

Inasmuch as claims 3-8 are dependent on claim 1, providing additional limitations to this claim, which is believed to be allowable as discussed above, claims 3-8 are also believed to be allowable.

Inasmuch as claim 17 is dependent on claim 16, providing an additional limitation to this claim, which is believed to be allowable as discussed above, claim 17 is also believed to be allowable.

In conclusion, it is respectfully submitted that claims 1-9 and 16-18 are neither anticipated nor rendered obvious by Skoog in view of Rigney and therefore are not rendered obvious by the combination of Skoog and Rigney and are therefore allowable.

C. Discussion of Ground 3.

Ground 3 - Whether claims 1-6 and 8 are unpatentable under 35 U.S.C. § 103(a) over as being unpatentable over Nagaraj et al. (U.S. Patent No. 5,545,437), hereinafter "Nagaraj", in view of Klabunde (U.S. Patent No. 4,877,647) hereinafter "Klabunde", and further in view of Kirk-Othmer and Rigney.

The following principle of law applies to all Section 103 rejections. MPEP 2143.03 provides "To establish prima facie obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F2d 981, 180 USPQ 580 (CCPA 1974).

All words in a claim must be considered in judging the patentability of that claim against the prior art. In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970)." [emphasis added] That is, to have any expectation of rejecting the claims over a single reference or a combination of references, each limitation must be taught somewhere in the applied prior art. If limitations are not found in any of the applied prior art, the rejection cannot stand. In this case, the applied prior art references clearly do not arguably teach some limitations of the claims.

The Examiner stated in the First and Second Office Actions:

> Nagaraj et al. teaches a method of applying a heat reflecting on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24). It is the examiners position that the ceramic thermal barrier coating dries prior to application of the heat reflective coating. Nagaraj et al. does not teach the claimed method of applying the heat-reflecting layer. However, Nagaraj et al. teaches that the heat-reflecting layer can be applied by any conventional deposition technique (Col. 3, lines 49-57). Klabunde teaches forming a reflective metal layer, such as a gold or platinum layer, on a substrate by forming a dispersion of metal particles and organic solvent carrier, applying the dispersion to a substrate and then heating/firing to form the metal layer, where the dispersion can be applied by spraying (Col. 3, lines 35-65; Col. 6, lines 30-54).
>
> Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engines is well established in the art, as shown by Kirk-Othmer. (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.
>
> It would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer on a gas turbine engine.
>
> Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer do not teach the gas turbine engine having an outer ceramic layer. However, Nagaraj et al teaches a gas turbine engine part, while preferably formed from a nickel-based superalloy, can also be other suitable high temperature materials (Column 3, lines 29-3 1). Rigney et at teaching of a thermal barrier coating for a gas turbine engine discloses that deposition of a thermal barrier coating is advantageous to insulate a superalloy and/or ceramic substrate from high temperature.
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to Nagaraj et at. in view of Klabunde and further in view of Kirk-

> Othmer to use the ceramic substrate as suggested by Rigney et al. to provide a desirable insulting coating because Rigney et at teaches both a superalloy and ceramic coating at known in the art to be subjected to high temperature environments.
>
> Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach the claimed amount of reflective coating mixture and thermal barrier coating applied to the substrate. However, it is the examiners position that the amount of these coatings applied to the turbine component are known result effective variables, as not enough of these coatings applied to the component would not provide the desired heat reflectance and thermal barrier properties, and too much would not offer additional benefits of increased heat reflectance and thermal properties.
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention was made to determine an optimal coating amount for the heat reflective layer and the thermal barrier layer, in the process of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at., through routine experimentation, to provide the desired heat reflecting and thermal barrier properties for the turbine component.

(Emphasis added).

Appellants continue to respectfully traverse this rejection.

Claim 1 is directed to a method of applying a heat-rejection coating, comprising the steps of: supplying a component of a gas turbine engine having an outer ceramic surface; providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment and an evaporable carrier; applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer; and firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component. (emphasis added).

Nagaraj, as understood, is directed to metal articles and protective layers that are applied to a metal article. Nagaraj has no teaching of a method for applying a reflective-coating mixture. Nagaraj teaches that his mixtures "can be readily deposited" (col. 3, line 60) and mentions "conventional deposition techniques" (col. 3, line 56), but gives no teaching of a specific approach.

Appellants note that the Examiner concedes Appellants' above characterization of Nagaraj as it was not disputed in the "Response to Arguments" in the Final Office Action. Appellants do not follow the Examiner's reasoning in the "Response to Arguments" in the Final Office Action, pages 2-3 that

> The Appicant has argued against the Nagaraj reference stating the present invention does not include a barrier coating, which is deposited by the techniques as disclosed at column 4, lines 15-16. The examiner notes the claim only requires the presence of the steps listed and does not limit the claim to exclude any other steps, which may include a thermal barrier coating as taught by Nagaraj or any other process steps.

Appellants assert that even if the above is true, Nagaraj does not teach or suggest providing a reflective-coating. Appellants go further. Appellants assert that Nagaraj teaches away from the present invention. First, the present invention recites only applying a reflective coating mixture, not both a reflective coating mixture and thermal barrier coating. Second, since the reflective coating mixture is not applied by previously identified methods as recited in claim 1, the amount applied may differ from previous application techniques. Further, the only deposition methods taught in Nagaraj for applying the barrier layer are chemical and physical vapor deposition (CVD and PVD), electroplating and plasma spray techniques. See col. 4, lines 15-18. These processes are specifically not within the scope of the present invention as claimed because they require complex deposition apparatus, and/or special chambers, and limit the size of the articles that may be coated. See paragraphs [0014] and [0037]. This is significant as to how Nagaraj et al. would be considered by one having skill in the art trying to deposit a reflective coat onto a ceramic outer surface of a gas turbine component. While the present invention lacks a thermal barrier coat, since the thermal barrier coat must be applied prior to the applying the reflective coat, which thermal barrier coat being deposited only by methods which are specifically outside the scope of the present invention, due to the special apparatus and chambers required, the subsequent reflective coat being applied by unnamed "conventional deposition techniques," such techniques would logically be the same apparatus and chambers already available to apply the thermal barrier coat. Since the present invention recites specific deposition techniques, none of which are disclosed or suggested by Nagaraj, with none of the deposition techniques taught by

Nagaraj being available to one practicing the present invention, due to the limitations of the Nagaraj techniques, Nagaraj necessarily teaches away from the present invention.

Klabunde, as understood, teaches "spraying or dripping" (col. 6, line 33), but has no teaching of any of the recited techniques. Klabunde also has no teaching of the use of his approach with a "reflective-coating mixture" as claimed. Appellant does not know whether palladium, platinum, and/or gold colloidal metal dispersions as taught by Klabunde will yield a "reflective-coating mixture" as claimed, and Klabunde has no teaching that they do.

As to the Kirk-Othmer publication, Appellants respectfully traverse the Examiner's contention that the Kirk-Othmer publication teaches coating a gas turbine engine. The Kirk-Othmer publication, as understood, does appear to identify air-assisted and other atomizer spraying techniques and identify some of their commercial uses. However, Appellants would like to point out that the context of the Kirk-Othmer publication, at least with respect to gas turbine engines, is clearly not that of the present invention. That is, for gas turbines, the Kirk-Othmer publication states "[f]or example, there is a growing concern over pollutant emissions from aircraft and automotive engines that utilize atomizers." See page 670. In other words, the spraying techniques cited in this publication with respect to atomizers appears directed to the internal workings of the gas turbine, i.e., the injection of fuel inside the engine for combustion, not applying a coating to the surface of a gas turbine engine. In addition, this publication fails to teach that heat-reflective coatings can be applied by spraying techniques.

Therefore, the Kirk-Othmer publication cannot form the basis for concluding that spraying a heat-reflective coating onto a gas turbine engine is obvious due to the expectation of successfully forming the reflective layer as the Examiner suggests. Further, due to the different context of use of the spray as disclosed in the Kirk-Othmer publication, the Kirk-Othmer publication is not combinable with the other references in an attempt to yield Appellants' invention.

In view of the above, the Examiner, in his Response to Arguments on page 3 in the Final Office Action states:

> The Appellant argues against the Kirk-Othmer publication stating that the context of the Kirk-Othmer reference is directed toward internal workings of gas

> turbine engine and fails to teach heat-reflective coatings can be applied by spraying techniques. The examiner respectfully disagrees. The Kirk-Othmer publication, as a whole, is directed to known and conventional spraying techniques and discloses, on page 688 in Table 2, air-atomizing sprays is a known method of spraying coatings. Therefore, the Kirk-Othmer publication, reasonably suggests to one of ordinary skill in the art to utilize air-assisted spraying to coat a substrate. Therefore, it would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer coating on substrate.

First of all, the Examiner has mischaracterized Appellants' response to the Examiner's first Office Action (page 5) stating:

> Nagaraj et al. in view of Klabunde does not teach the spraying is an air assisted spraying technique. However, using air to atomize and project a spray for coating a gas turbine engine is well established in the art, as shown by Kirk-Othmer (see page 672, Table 1, page 688, Table 2), and hence would have been an obvious method of spraying the heat-reflective coating because of the expectation of successfully forming the reflective layer.

Appellants had pointed out, as previously stated, that the Kirk-Othmer publication in fact does not show that it is well established in the art to use air to atomize and project a spray for coating a gas turbine engine, only that certain types of atomizers are used by internal components gas turbines that have to do with the operation of fuel injection, not spray coatings. Appellants note the Examiner's clarification of Kirk-Othmer, i.e., that the Kirk-Othmer publication, as a whole, is directed to known and conventional spraying techniques, disclosing air-atomizing sprays as a known method of spraying coatings, noting again that the reference to gas turbine engines refer to internal components of gas turbines. However, Appellants assert that the purpose of Kirk-Othmer is not to oxidize/combust the coating material. Moreover, Appellants strongly disagree with the Examiner's conclusion. Even if Kirk-Othmer reasonably suggests that air-assisted spraying is available for the applications identified therein, it does not disclose or suggest that any methods for coatings applied to the surface of a gas turbine engine. That is, a reflective coating mixture as recited in independent claim 1.

Moreover, Appellants strongly disagree that even if Kirk-Othmer taught or suggested that air-assisted spraying can be applied to the surface of a gas turbine engine, which it doesn't, that it would have been obvious to one of ordinary skill at the time of the invention was made to apply the heat reflective layer of Nagaraj using conventional spraying as taught by Klabunde and specifically the conventional air-assisted spraying as disclosed by Kirk-Othmer because of the expectation of successfully applying the heat reflective layer coating on substrate. First of all, as discussed above, Nagaraj does not disclose or suggest any methods for applying a reflective coating, and discloses methods of applying the diffusion layer that are specifically outside the scope of the present invention, thereby teaching away from the present invention as discussed previously. Moreover, Klabunde has no teaching of any of the recited techniques. Klabunde also has no teaching of the use of his approach with a "reflective-coating mixture" as claimed. Appellant does not know whether palladium, platinum, and/or gold colloidal metal dispersions as taught by Klabunde will yield a "reflective-coating mixture" as claimed, and Klabunde has no teaching that they do. Finally, Kirk-Othmer does not teach or suggest applying an air assisted coating, or any coating for that matter, that is applied to the outside surface of a gas turbine engine component. Therefore, even if these references were to be combined, they would not yield Appellants' invention.

Rigney has previously been discussed, the discussion equally applicable herein.

Furthermore, "[t]he mere fact that references <u>can</u> be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination." See Manual of Patent Examining Procedure, 8th Edition (MPEP), Section 2143.01.

The Examiner is reminded that "[i]f the proposed modification or combination of the prior art would change the principle or operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *See* MPEP, Section 2143.01.

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is

> nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

*See* Manual of Patent Examining Procedure, 8th Edition (MPEP), Section 2143.03.

Nagaraj et al. teaches application techniques that cannot be used to practice the claimed invention, and which are specifically identified above.

Therefore, for the reasons given above, independent claim 1 is believed to be distinguishable from Nagaraj, Klabunde, Kirk-Othmer and Rigney and therefore are neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer and Rigney.

Dependent claims 2-6 and 8 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 2-6 and 8 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 1-6 and 8 are neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer and Rigney and are therefore allowable.

D. Discussion of Ground 4.

Ground 4 - Whether claim 7 is unpatentable under 35 U.S.C. § 103(a) as being unpatentable over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 6, and further in view of Vakil (U.S. Patent No. 5,407,705) hereinafter "Vakil."

Specifically, the Examiner stated in the First and Final Office Actions that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach the claimed thermal barrier layer material containing lanthanum or cerium. Vakil teaches a nickel-based superalloy gas turbine engine component having a ceramic thermal barrier coating, where the coating can include cerium (Col. 6, lines 1-25).
>
> It would have been obvious to one skilled in the art at the time the invention was made to use the ceramic thermal barrier coating material of Vakil, including the cerium component, in the process of Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. with the expectation of providing suitable thermal barrier properties, as shown by Vakil for nickel-based superalloy gas turbine engine components.

Appellants respectfully traverse the rejection of claim 7 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj, Klabunde, Kirk-Othmer and Rigney are equally applicable here.

Claim 7 recites the method of claim 6, wherein the step of applying the ceramic barrier coating further includes applying a coating comprising a ceramic material selected from the group consisting of lanthanum and cerium.

Dependent claim 7 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 7 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 7 is neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer, Rigney and Vakil and is therefore allowable.

E. Discussion of Ground 5.

Ground 5 - Whether claim 9 is unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 6, and further in view of Eppler.

Specifically, the Examiner stated in the First and Final Office Actions that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach that the ceramic thermal barrier coating is applied by air assisted spraying. However, Eppler teaches breaking down a ceramic into fine particles and air assisted spraying them onto a substrate (Page 955, Column 3).
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. to use the air assisted spray technique suggested by Eppler to provide a desirable ceramic coating on a substrate Eppler teaches air-assisted spraying is known in the art to provide ceramic coatings onto a substrate.

Appellants respectfully traverse the rejection of claim 9 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj, Klabunde, Kirk-Othmer and Rigney are equally applicable here.

Eppler, as understood, is directed to spraying ceramic coatings.

Dependent claim 9 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 9 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 9 is neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer, Rigney and Eppler and is therefore allowable.

F. Discussion of Ground 6.

Ground 6 - Whether claim 10 is unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 6, and further in view of Tecle (U.S. Patent No. 5,922,403) hereinafter "Tecle".

Specifically, the Examiner stated that the First and Final Office Actions:

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. does not teach of providing a reflective-coating mixture with a noble metal encapsulator. Tecle teaches of a method for forming a palladium, silver, gold or platinum in an organic carrier (Col. 3, lines 25-35). Tecle discloses utilizing an encapsulant material to limit the required amount of solvent (Col. 4, lines 59-67). Tecle utilizes a metallic colloidal solution with fluxing agents to coat ceramics, metals, and ceramic/metal composites (Column 7, lines 10-31).
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et at. to use a solution containing a metal encapsulant and fluxing agent as taught by Tecle to provide a desirable metallic coating because Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. teaches using a metallic pigment in an organic solvent for coating a surface and Tecle teaches a metal encapsulant reduces the large amount of solvent required when coating a ceramic or metal substrate and fluxing agents are provide enhanced adherence of a coating to a substrate.

Appellants respectfully traverse the rejection of claim 10 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj, Klabunde, Kirk-Othmer and Rigney are equally applicable here.

Tecle, as understood, is directed to preparing formulations having ultrafine particles that can be placed in a solvent that encapsulates the solvent as applied. Tecle fails to disclose a technique for applying the solvent to an article substrate, and there is question whether the Tecle

solvent can be applied by at least some of the recited application techniques due to the decreased amount of solvent contained in the Tecle suspension.

Dependent claim 10 is believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claim 10 recites further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 10 is neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer, Rigney and Tecle and is therefore allowable.

G. Discussion of Ground 7.

Ground 7 - Whether claims 11-13 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. as applied to claim 1, and further in view of Akechi (Japanese Publication No. JP 60081892A) hereinafter "Akechi."

Specifically, the Examiner stated in the First and Final Office Actions that

> Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer and Rigney et al. does not teach a reflective coating mixture containing a glass or ceramic comprising up to 25 wt% of the reflective mixture. Akechi teaches of using glass frit and noble metal dispersion in an organic vehicle to from a coating (Abstract). Akechi discloses using 1-3 wt % glass frit and 37-59 wt % noble metal powder in a 40-60 wt % organic vehicle (abstract). The subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made if the overlapping portion of the range as disclosed by the reference were selected because overlapping ranges have been held to be prima facie case of obviousness. See In re Wortheim 191 USPQ 90.
>
> Therefore, it would have been obvious to one skilled in the art at the time of the invention to modify Nagaraj et al. in view of Kiabunde and further in view of Kirk-Othmer and Rigney et al. to use the glass fritlnobte metal in an organic vehicle taught by Akechi to provide a desirable noble metal coating which experiences no deformation when coating.

The Examiner also stated in the Response to Arguments, page 5 in the Final Office Action

> The Appicant has argued against the Akechi reference stating that it teaches a thick paste and not therefore cannot be applied by the coating techniques of the present invention. The examiner only utilizes Akechi as a showing that it is known in the art to provide a glass filler in a noble

> metal/organic carrier dispersion. In response to Applicant's argument that Akechi is nonanalogous art, it has been held that a prior art reference must either be in the field of Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the Applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker,* 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both the prior art and the present claims are directed to applying a metal/organic coating onto a substrate.

Appellants respectfully traverse the rejection of claims 11-13 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj, Klabunde, Kirk-Othmer and Rigney are equally applicable here.

Akechi, as understood, based on the English translation of the Abstract, is directed to a thick film paste of predetermined percentages by weight of precious metal powder, glass frit and an organic vehicle for preparing a thermal print head. However, the Abstract is insufficient to clarify the discussion of conductive and insulative layers.

In contrast, claim 11 is directed to the method of claim 1 wherein the provided reflective coating mixture contains a predetermined amount of filler.

In contrast, claim 12 is directed to the method of claim 11 wherein the filler material is glass or ceramic materials.

In contrast, claim 13 is directed to the method of claim 12 wherein the filler comprises up to about 25 percent of the reflective mixture by weight.

Appellants note that by virtue of the Akechi material being presented in the form of a thick paste, the only identified application technique is printing, which technique is not included as any of the recited application techniques of the present invention. Additionally, Akechi is directed to thermal printing heads, which are not remotely related to reflective coatings on gas turbine engines, and is therefore non-analogous art. Therefore, Akechi is not properly combinable with the other references. As such, Appellants continues to respectfully disagree with the Examiner's position. If the rejection is to be sustained, Appellants continue to request the Examiner to provide a complete translation of Akechi.

On this point, the United States Patent and Trademark Office Board of Patent Appeals and Interferences ("Board") in a recent non precedential opinion reversed a rejection in which

"the examiner relied upon abstracts of two published Japanese patent applications without referring to translations of the underlying applications." *Ex parte Gavin*, 62 USPQ2d 1680, 1683 (BdPatApp&Int 2001) (unpub). In *Gavin*, the Board stated:

> An abstract and the underlying document of which it is a summary are distinct documents. In a rejection, an abstract stands on its own—it does not incorporate by reference any disclosure of the underlying document. Abstracts are often not written by the author of the underlying document, and may be erroneous or misleading—in virtually all cases, they are incomplete...In our view, obtaining translations is the responsibility of the examiner.

*Id.* 1683-84. Accordingly, as discussed by the Board, the Abstract and the underlying documents are distinct documents. Thus, if the Examiner wants to use the underlying reference to support his position, the Examiner should obtain a complete translation of the reference and provide Appellants with a copy of the translation so that a response to the Examiner's position may be prepared.

Moreover, dependent claims 11-13 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 11-13 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claim 11-13 is neither anticipated nor rendered obvious by Nagaraj et al., Klabunde, Kirk-Othmer, Rigney et al. and Akechi and are therefore allowable.

H. Discussion of Ground 8.

Ground 8 - Whether claims 14-15 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj in view of Klabunde and further in view of Kirk-Othmer and Rigney as applied to claim 1, and further in view of Skoog.

The above discussion of Nagaraj, Klabunde, Kirk-Othmer, Rigney and Skoog are equally applicable here.

Dependent claims 14-15 are believed to be allowable as depending from what is believed to be allowable independent claim 1 for the reasons given above. In addition, claims 14-15 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 14-15 are neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer, Rigney and Skoog and are therefore allowable.

I. Discussion of Ground 9.

Ground 9 - Whether claims 16-22 are unpatentable under 35 U.S.C. § 103(a) over Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney, Eppler, Tecle, Akechi and further in view of Demaray (U.S. Patent No. 4,676,994) hereinafter "Demaray."

Specifically, the Examiner stated in the First and Final Office Actions that

> Nagaraj et at. in view of Klabunde and further in view of Kirk-Othmer, Rigney et at., Eppler, Tecle, and Akechi teaches all the limitations of these claims as discussed above, except pre-treating the component surface prior to coating. Demaray teaches pretreating a component prior to application of a thermal barrier layer, in order to achieve a desired surface roughness (Col. 2, line 49-Col. 3, line 5). One skilled in the art would have recognized that such polishing/roughening is conventionally used for enhancing the adhesion of subsequently applied coatings to a substrate.
>
> Therefore, it would have been obvious to one skilled in the art to pretreat the nickel-based superalloy component of Nagaraj et al. in view of Klabunde and further in view of Kirk-Othmer, Rigney et al., Eppley, Tecle, and Akechi, prior to applying the coatings, in order to enhance the bonding of the coatings to the metal components, since polishing of superalloys prior to coating to enhance coating adhesion is disclosed by Demaray.

Appellants respectfully traverse the rejection of claims 16-22 under 35 U.S.C. § 103(a).

The above discussion of Nagaraj, Klabunde, Kirk-Othmer and Rigney, Eppler, Tecle and Akechi is equally applicable here.

In contrast, claim 19 is directed to the method of claim 16 wherein the step of spraying reflective-coating mixture further includes spraying a mixture comprising a noble metal encapsulator.

In contrast, claim 20 is directed to the method of claim 16 wherein the step of spraying the reflective coating mixture includes spraying a mixture that includes a predetermined amount of filler.

In contrast, claim 21 is directed to the method of claim 20 wherein the filler material is selected from the group consisting of glass and ceramic materials.

In contrast, claim 22 is directed to the method of claim 21 wherein the filler comprises up to about 25 percent of the reflective mixture by weight.

It is noted that the arguments for patentability for claim 19 is similar to that already discussed in Issue 5 and that Demaray adds nothing to this discussion. Similarly the arguments for patentability for claims 20-22 are similar to that already discussed in Issue 6 and that Demaray adds nothing to this discussion.

Demaray, as understood, is directed to applying ceramic coats to article substrates. While Appellants concur that the cited portion of Demaray (col.2, line 49 through col. 3, line 5) teaches applying a ceramic coat to a substrate, Appellants also note that the cited portion is directed to a metal substrate, not a ceramic coated substrate, which is the claimed substrate in claim 16. Additionally, the base material in Demaray is polished, in contrast to grit blasting as disclosed in the present invention (see Figure 6). Finally, the ceramic material in Demaray is applied by techniques other than air-assisted spraying. See col. 3, line 55 through col. 5, line 30. Further, Appellants note that grit blasting is only employed as a pretreatment if the substrate is metal. (See paragraph [0042]). When a ceramic or ceramic coated article is provided, however, grit blasting is not performed, and a bond coat is applied, followed by a subsequent thermal barrier coat and then a subsequent smooth coat. In other words, the component pre-treating of the present invention is not taught or suggested in Demaray, and in fact, Demaray teaches away from the present invention.

Therefore, for the reasons given above, claims 16 and 19-22 are believed to be distinguishable from Nagaraj, Klabunde, Kirk-Othmer and Rigney and Demary and therefore are neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer and Rigney and Demaray.

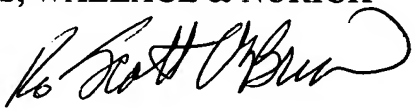
Dependent claims 17-18 are believed to be allowable as depending from what is believed to be allowable independent claim 16 for the reasons given above. In addition, claims 17-18 recite further limitations that distinguish over the applied art. In conclusion, it is respectfully submitted that claims 16-22 are neither anticipated nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer and Rigney and Demaray and are therefore allowable.

J. Conclusion

In view of the above, Appellants respectfully requests a favorable action on this pending Appeal and withdrawal of the outstanding rejections. As a result of the remarks presented herein, Appellants respectfully submit that claims 1-22 are not anticipated by, nor rendered obvious by Nagaraj, Klabunde, Kirk-Othmer, Rigney, Vakil, Eppler, Tecle, Akechi, Skoog and Demaray or their combinations and thus, are in condition for allowance.

Respectfully submitted,

**McNEES, WALLACE & NURICK**

By 

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Dated: October 21, 2005

Attachments (Claims Appendix, Evidence Appendix,
and Related Proceedings Appendix)

## 8. *CLAIMS APPENDIX*

Unmarked Copy of Claims as of first Office Action dated January 4, 2005, the last form acted on by the Examiner.

1. A method of applying a heat-rejection coating, comprising the steps of:

supplying a component of a gas turbine engine having an outer ceramic surface;

providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment and an evaporable carrier;

applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer; and

firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component.

2. The method of claim 1, wherein the step of applying the reflective-coating mixture includes applying the reflective-coating mixture by air-assisted spraying.

3. The method of claim 1, wherein the step of providing the reflective-coating mixture includes providing the metallic pigment selected from the group consisting of platinum, gold, silver, rhodium, palladium, and alloys thereof.

4. The method of claim 1, wherein the step of providing the reflective-coating mixture includes providing an organic reflective-coating-mixture carrier.

5. The method of claim 1, wherein the step of applying the reflective-coating mixture includes a step of air-assisted spraying the reflective-coating mixture such that the reflective coating has an areal weight of from about 0.00275 to about 0.00475 grams per square inch of a surface to which it is applied.

6. The method of claim 1, further including an additional step, before the step of providing the reflective-coating mixture, of applying a ceramic thermal barrier coating over the component

surface, and wherein the step of applying the reflective-coating mixture includes the step of applying the reflective-coating mixture onto the ceramic barrier coating applied to the component surface.

7. The method of claim 6, wherein the step of applying the ceramic barrier coating further includes applying a coating comprising a ceramic material selected from the group consisting of lanthanum and cerium.

8. The method of claim 6, wherein the step of applying the ceramic barrier coating further includes applying a ceramic-barrier-coating mixture to the surface such that the mixture has an areal weight of from about 0.00325 to about 0.00625 grams per square inch.

9. The method of claim 6, wherein the step of applying the ceramic barrier coating further includes the step of air-assisted spraying the ceramic-barrier-coating mixture onto the component, and drying the ceramic-barrier-coating mixture.

10. The method of claim 1 wherein the provided reflective-coating mixture further comprises a noble metal encapsulator.

11. The method of claim 1 wherein the provided reflective coating mixture contains a predetermined amount of filler.

12. The method of claim 11 wherein the filler material is glass or ceramic materials.

13. The method of claim 12 wherein the filler comprises up to about 25 percent of the reflective mixture by weight.

14. The method of claim 1 wherein the step of firing the component includes firing the component from about 1,100°F to about 2,150°F.

15. The method of claim 1 wherein the step of firing the component includes firing the component at about 1,650°F.

16. A method of applying a heat-rejection coating, comprising the steps of:

supplying a component of a gas turbine engine, the component having a ceramic surface;

pre-treating the component surface to form a pre-treated component surface; thereafter

air-assisted spraying a reflective-coating mixture onto the pre-treated component surface, the reflective-coating mixture comprising a metallic pigment and a reflective-coating-mixture carrier; and

firing the component having the coating mixture thereon.

17. The method of claim 16, further including the additional step of supplying a component of a gas turbine engine, and applying a ceramic coating over a surface of the component.

18. The method of claim 17, wherein the step of applying the ceramic coating further includes the steps of air-assisted spraying a ceramic-barrier-coating mixture onto the component, and drying the ceramic-barrier-coating mixture.

19. The method of claim 16 wherein the step of spraying reflective-coating mixture further includes spraying a mixture comprising a noble metal encapsulator.

20. The method of claim 16 wherein the step of spraying the reflective coating mixture includes spraying a mixture that includes a predetermined amount of filler.

21. The method of claim 20 wherein the filler material is selected from the group consisting of glass and ceramic materials.

22. The method of claim 21 wherein the filler comprises up to about 25 percent of the reflective mixture by weight.

## 9. *EVIDENCE APPENDIX*

None.

## 10. *RELATED PROCEEDINGS APPENDIX*

None.